
Water Resources

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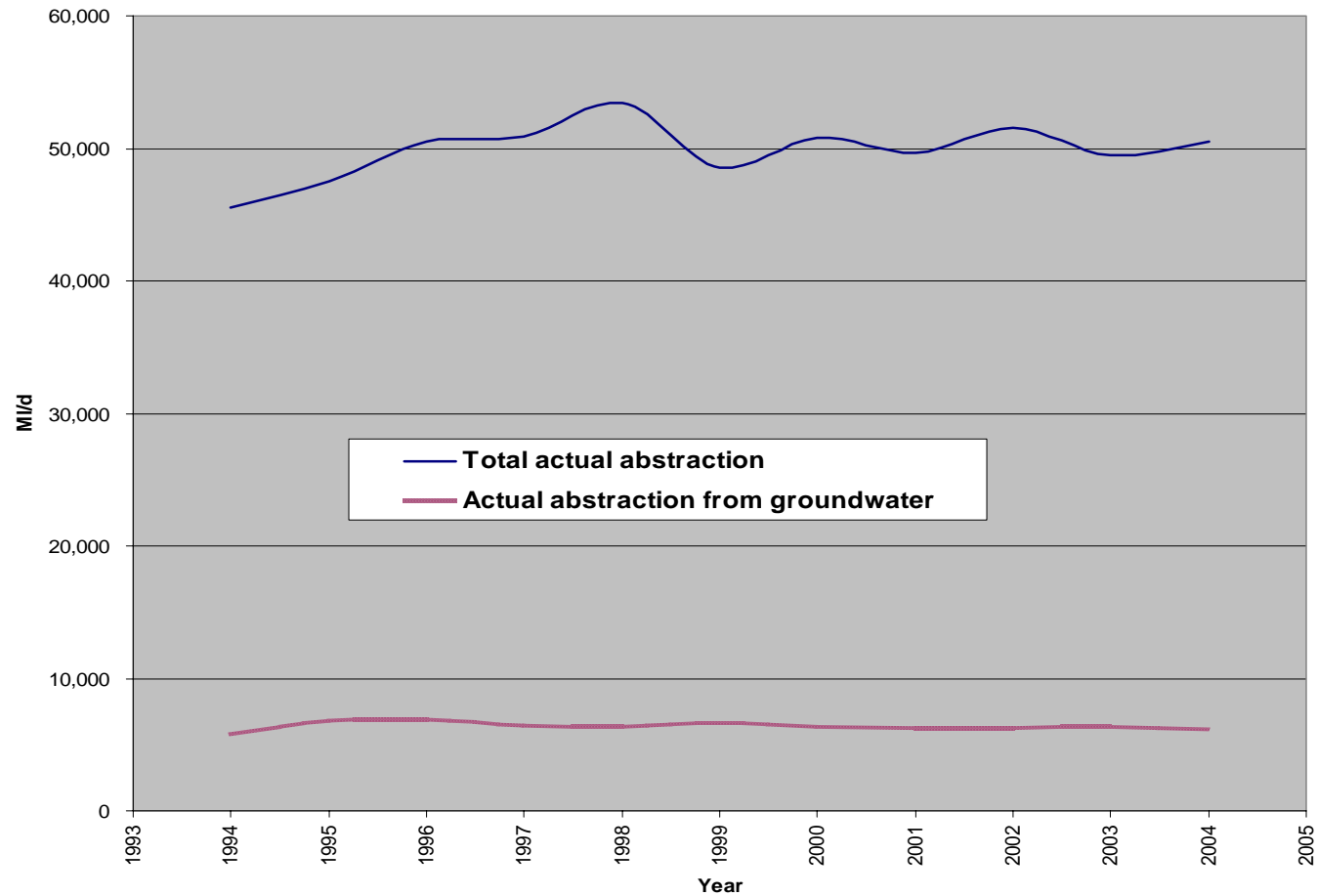
Relevant WFD Objectives

- Prevent deterioration
- Enhance protected areas
- Restore/maintain good ecological status
 - NB : no direct guide on flow targets in rivers estuaries and lakes to control abstraction
- Groundwater – good quantitative status
- Promotion of sustainable use

Abstraction in England and Wales, 2004 (Groundwater & non-tidal surface water)

	MI/d	Mte per year
England & Wales	37950	13850
Public supply	16500	6024
Electricity supply (non-consumptive)	11600	4226 *
Industry	4350	1586
Agriculture	640	234
Fish farms & others	4070	1485

Abstraction trends -England



Abstraction & Flow Standards

- No direct guide on flow targets in rivers estuaries and lakes to control abstraction
- UK TAG standards
 - River & lakes available: consultation last year
 - Estuary and groundwater: just out to consultation

Abstraction & Flow Standards (2)

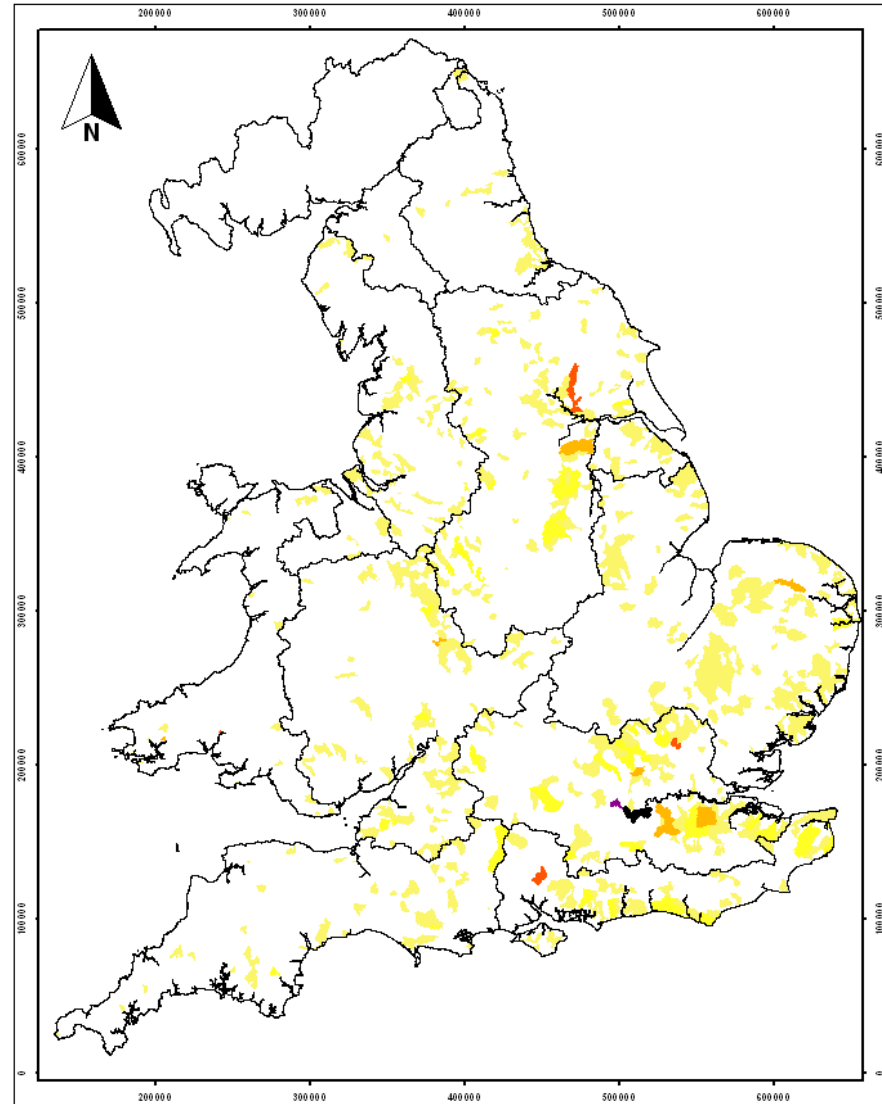
- No simple causal relationship between flow and ecological status
 - different river types
 - expert opinion used to estimate allowable abstraction for each type.
 - best science but precautionary => **significant uncertainties**
 - similar to CAMS river flow objectives

Flow standards v Existing Flows

- Existing flows made up of abstraction and discharges
- Estimated for 8,000 water bodies using LowFlow 2000 model
- Compare this with standards
 - where existing flows fall below standard = potential flow deficits
- Measures need to address the deficit

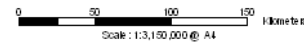
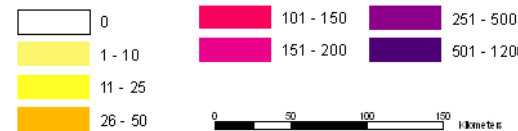
Flow Deficits in England

- Using UKTAG standards
 - 8000 assessment points
 - Deficit = 3300 Mld
- Using EA CAMS data
 - 1200 assessment points
 - Deficit = 1100 Mld
- **Range of deficit = 1100- 3300 Mld**
- **90-95% due to Water Company abstractions**



Key

Deficit Recovery (MI/d)



WFD RIA (Water Resources)

Potential Deficit Recovery Requirements to Meet REFS in all Water Bodies, Recent Actual Abstraction Scenario at Q95

May 2007
20778-A25.mxd BO LLM



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Possible Water Resources Measures

- Any measure that reduces demand will in theory reduce abstraction and hence potential flow deficit
 - Water industry
 - Leakage
 - Demand management etc
 - Relocate or replace abstraction source works e.g. new borehole
 - But need to maintain supplies =>new resources ?
 - Other abstractors
 - more efficient use

Possible Water Resources Measures (2)

- EA Actions
 - Augmenting supplies – eg stream support
 - Reasonable requirement test for new licences
 - Licence variation and revocations
 - Statutory process exists but largely untested
 - Compensation payments will generally arise for changes to permanent licences

Cost effectiveness of measures

- Replacement of sources requires careful planning to avoid disruption to supplies
 - Effectiveness of some measures limited by implementation time.
 - e.g. Metering implemented more quickly than a new source
 - Some measures have limits to effectiveness
 - e.g. Metering reduce demand by up to 10%
- Costs for replacement sources can escalate in areas of water scarcity.
- Optimum combination of measures managed in water company WR plans process.
- **Unit cost range of measures of £2 to £5m per MI/day**

Range of unit costs

	England		Wales	
Range of Unit Costs £m per MI/d	CAMS 1 1059 MI/d	Conditional Flow Standards 3388 MI/d	CAMS 1 15 MI/d	Conditional Flow Standards 172 MI/d
2.0	£2,118m	£6,776m	£30m	£344m
5.0	£5,295m	£16,940m	£75m	£860m

Scenario 1 – No Delay

- Need to achieve WFD objectives by 2015
 - a) No deterioration in flows to support ecological status
 - b) Complete obligations for protected areas by 2015
 - c) Manage existing abstraction impacts on flows to support GES
- **£3.6 -18.4 billion (England)**
- **£ 72 – 905 million (Wales)**

Uncertainty

- ‘Water resources programme of measures’ needs to account for
 - Uncertainty in the effectiveness of changes to flow on ecological status
 - Don’t want to spend money where there is no real world effect
 - Different regional combinations of measures
 - Eg timing of water company measures to get optimum results

Scenario 2 - Phased Programme (1)

- To cope with uncertainty
 - Aim to achieve WFD objectives over 3 cycles
 - Use alternative objectives on grounds of disproportionate cost and technical feasibility

Phased Programme -

No deterioration due to new abstraction

- Revised abstraction control procedures + CAMS to recognise new conditional standards
- Commitments to limiting/reducing water demands
 - work of the Water Saving Group etc
 - Metering, water efficient new build etc

Phased Programme - Dealing with Protected Areas

- Restoring Sustainable Abstraction
 - complete investigations for Habitats directive review of abstraction consents
 - implement measures to limit impact on HD sites by 2015
 - impact on water company and non-water company abstractions
 - some via price review some via compensation/charges

Phased Programme - Managing Abstraction to Support GES

- Include flow requirements for estuaries and groundwater balances
- Compare potential flow deficits with ecological classification and heavily modified water bodies
- Use results to flow deficits to prioritise/target site specific investigations
- Site specific investigations to include consideration of water quality and alterations to morphology

Programme for 1st Cycle ending 2015

- Revise abstraction licensing system and CAMS by 2008
- Complete measures to limit water demands
- Complete measures required to limit abstraction impacts on HD sites by 2015
- Complete site specific investigations at first tranche of potential flow deficit sites
- Revise conditional flow standards in light of monitoring and investigations
- £1.5 - 1.8 billion (England)
- £ 43 - 63 million (Wales)

Programme for 2nd Cycle ending 2021

- Complete abstraction reduction measures required to support good ecological status identified in 1st cycle investigations by 2021
- Complete site specific investigations at second tranche of potential flow deficit sites by 2021
- £0.7 - 4.4 billion (England)
- £7.5 -215 million (Wales)

Programme for 3rd Cycle ending 2027

- Complete abstraction reduction measures requires to support good ecological status identified in 2nd cycle investigations by 2027
- £0.5- 4 billion (England)
- £7- 215 million (Wales)

Conclusions

- Uncertainty is significant
 - Effectiveness of measures themselves
 - Unit cost of measures
- Need site specific investigations to inform measures to reduce uncertainty
- E&W : costs £3.6-19.5 billion if one hit
- E&W : costs £2.8 -10.6 billion if phased